Appendix 12

Impoundment Survey

Lamprey Impoundment Survey

A bathymetry survey of the two largest impoundments on the designated river was conducted on October 5th and 6th 2006 by the Northeast Instream Habitat Program. One day was spent at each impoundment site and as much data as possible was collected during that time. The surveys were conducted using a canoe outfitted with a 50 pound thrust electric motor, an Acoustic Doppler Current Profiler (ADCP) and a Trimble survey grade GPS. The ADCP and GPS were connected to a tablet field computer, and data was collected using Sontek's River Surveyor software. The ADCP has three sensors which measure depth, and an average of the three is supplied to the surveying program. Measurements are taken continuously but averaged over a 5-second interval to help eliminate errors associated with false signals and small debris. Each averaged depth measurement is supplied with a geographical coordinate by the GPS and is stored in a text file.

On the first day of surveying, we started at the Wiswall Dam boat launch and followed the shoreline upstream as far as possible to the head of the impoundment before returning to the opposite shoreline. At this point, we returned upstream to conduct a second pass that would allow us to evenly divide the river and collect as much information on the character of the stream bed as possible. Next, we made an additional circuit where we decided to zigzag across the river from bank to bank both up and downstream to catch more of the areas that may have been missed by the initial passes. Finally, we spent some additional time carpeting the area just upstream of the dam. A total of 3857 valid depth measurements were recorded in the Wiswall Impoundment (see Figure 1).

The second day of surveying was dedicated to the much larger Newmarket Impoundment. We followed a similar protocol as with the Wiswall survey, accessing the river through the cemetery boat launch seen in the southwest corner of Figure 2. We then followed the right bank down to the face of the McCallen Dam before heading up the left bank to the top to the impoundment, and then down again along the right bank to complete the circuit. This large loop was repeated once more by attempting to stay approximately one third of the width of the river's distance from every bank we followed. Due to the length of this impoundment, we were unable to make the zigzag pass that was made on the Wiswall Impoundment. A total of 9032 valid depth measurements were recorded in the Newmarket Impoundment (see figure 2).

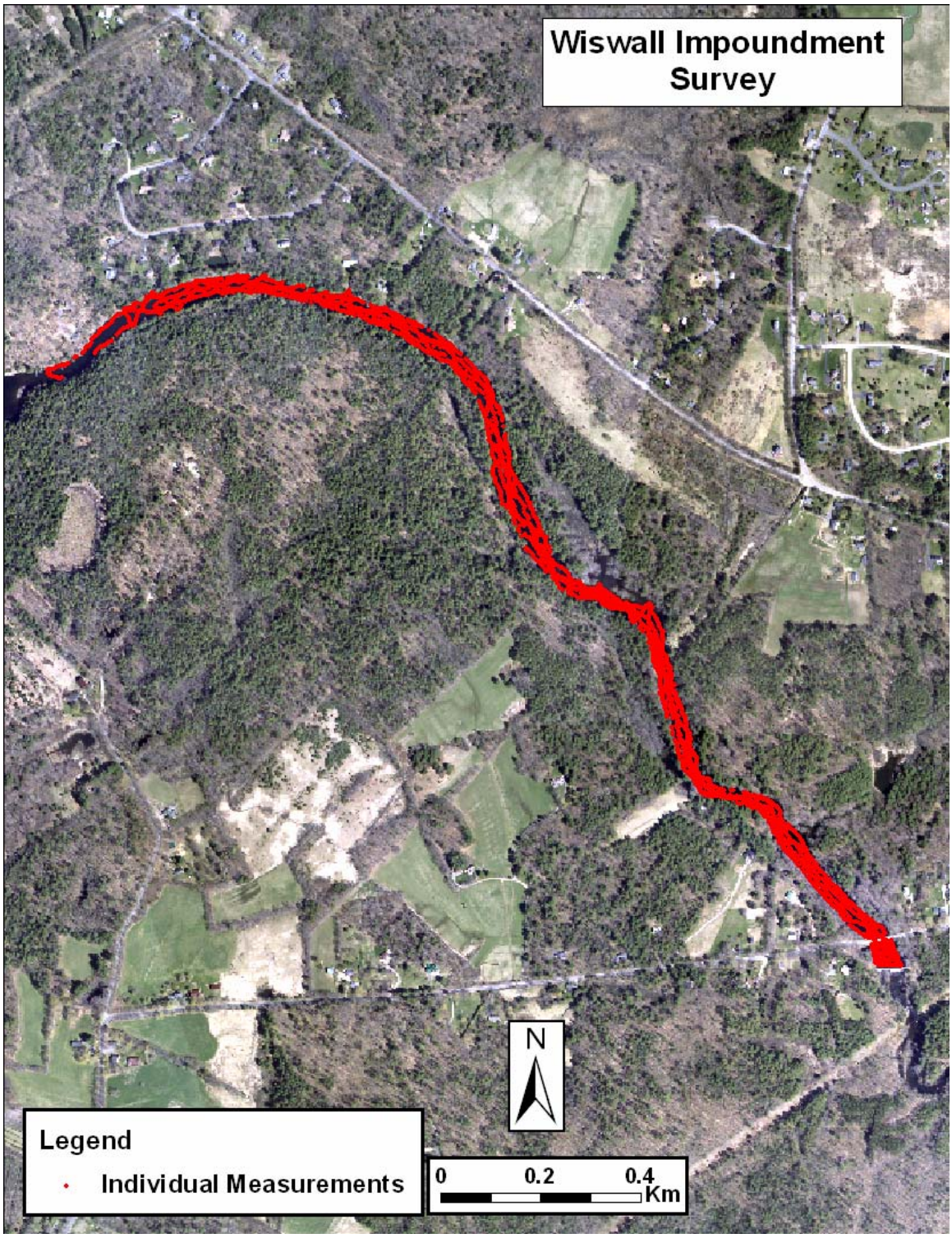


Figure 1. Map of the extent of individual ADCP data points collected from the Wiswall Impoundment.

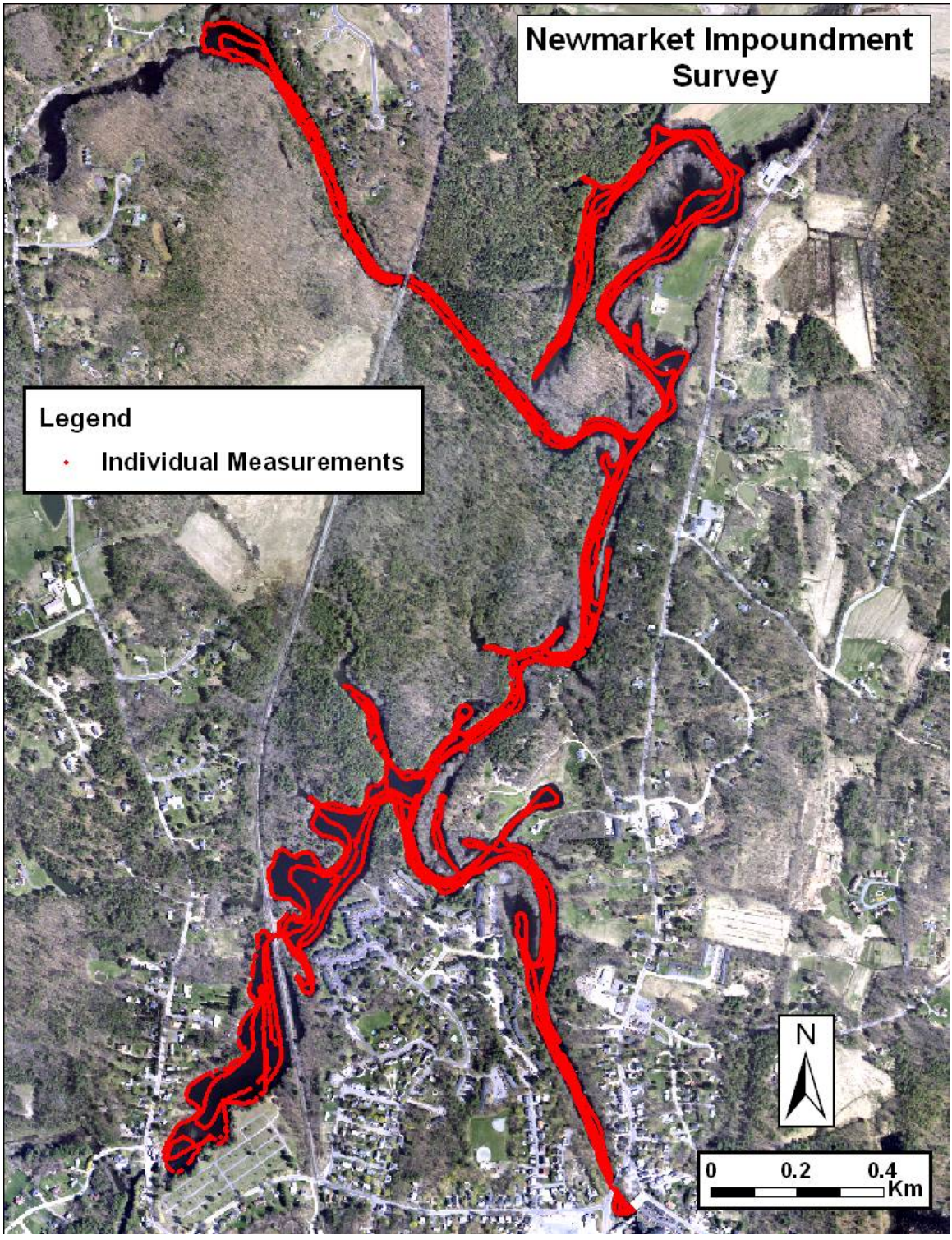
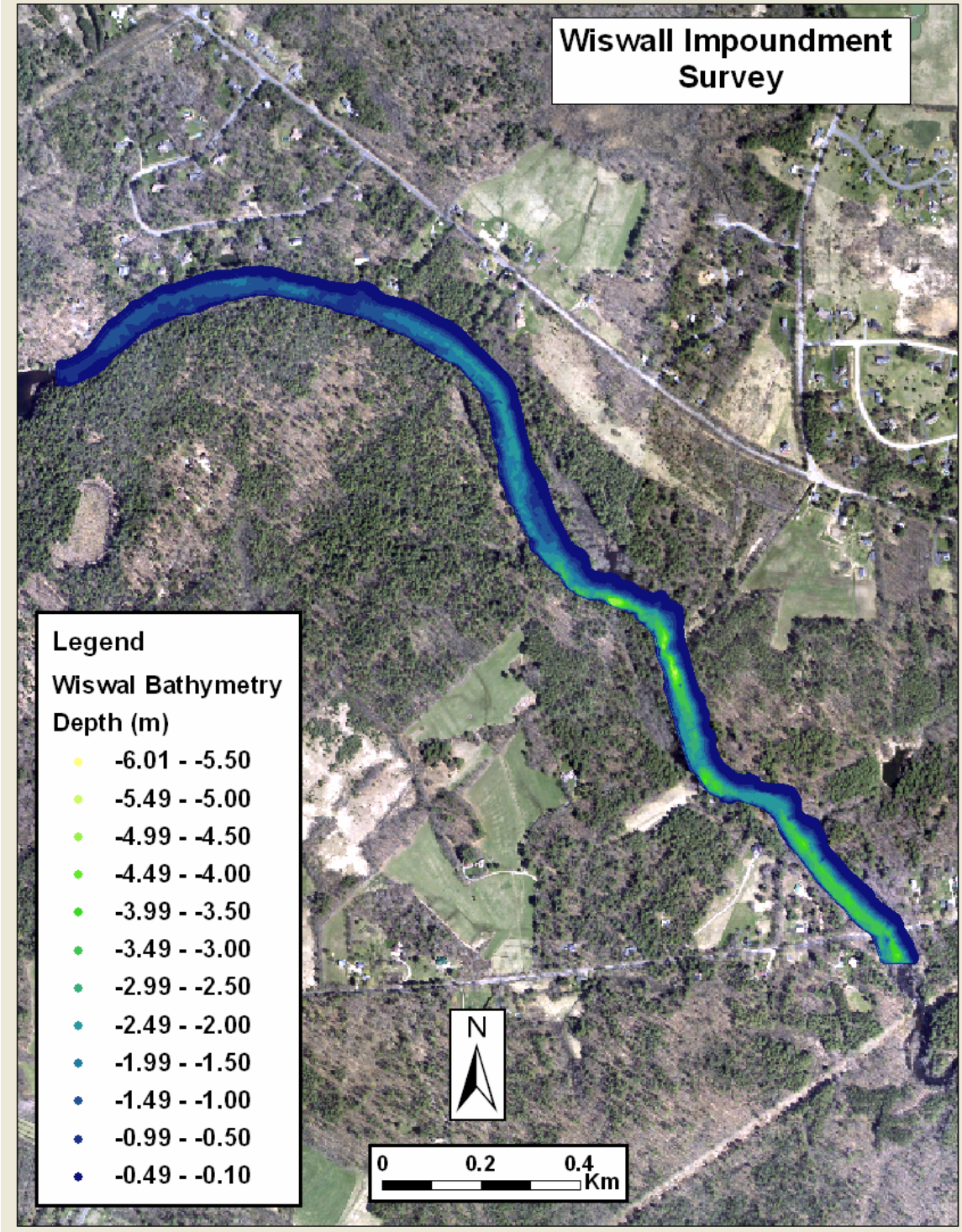
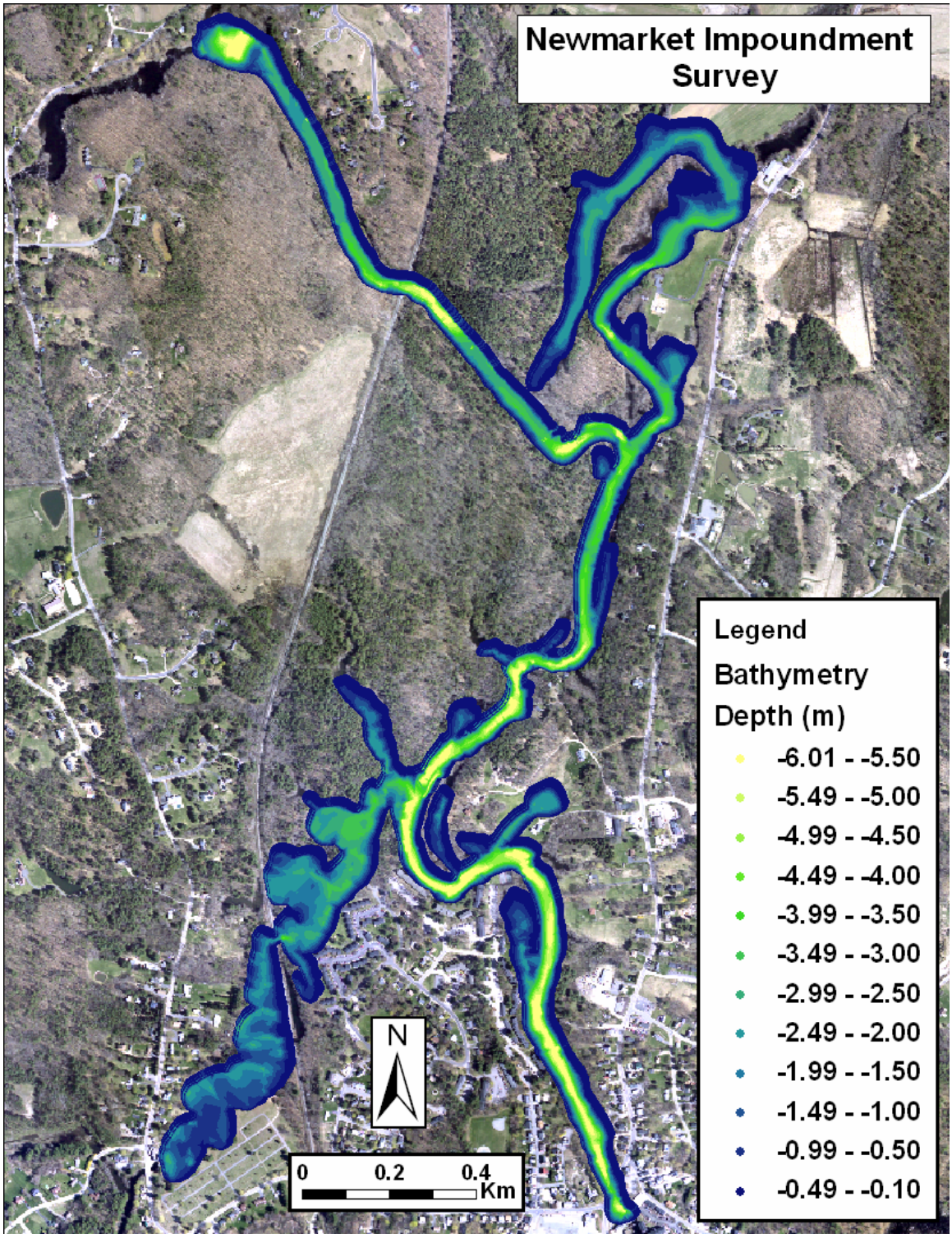


Figure 2. Map of the extent of individual ADCP data points collected from the Newmarket Impoundment.

Data collected during the survey was converted into a GIS shapefile for viewing with the geo-rectified aerial photos taken of the impounded areas. Next, a trace of the shoreline was made digitally to provide the outer limit of the interpolation between data points. A mesh was developed using the program River2D that interpolated depths between each of the surveyed points in the impoundments. Finally, from this mesh, a grid of bathymetry was developed and used to create Figures 3 and 4. This data was then used during the development of baseline conditions in Simstream by adjusting the water depths to represent natural conditions and estimating the resulting hydromorphological assemblages. In addition to the ADCP survey, spot checks of areas of interest were conducted by scuba around Wiswall Dam, the Newmarket railroad tressel bridge and the Lamprey's confluence with the Moat Island wetland complex.


Wiswall Impoundment Survey
Legend
Wiswal Bathymetry
Depth (m)
-6.01 - -5.50
-5.49 - -5.00
-4.99 - -4.50
-4.49 - -4.00
-3.99 - -3.50
-3.49 - -3.00
-2.99 - -2.50
-2.49 - -2.00
-1.99 - -1.50
-1.49 - -1.00
-0.99 - -0.50
-0.49 - -0.10
N
0
0.2
0.4
Km


Newmarket Impoundment Survey
Legend
Bathymetry
Depth (m)
-6.01 - -5.50
-5.49 - -5.00
-4.99 - -4.50
-4.49 - -4.00
-3.99 - -3.50
-3.49 - -3.00
-2.99 - -2.50
-2.49 - -2.00
-1.99 - -1.50
-1.49 - -1.00
-0.99 - -0.50
-0.49 - -0.10
N
0
0.2
0.4
Km